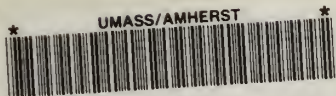
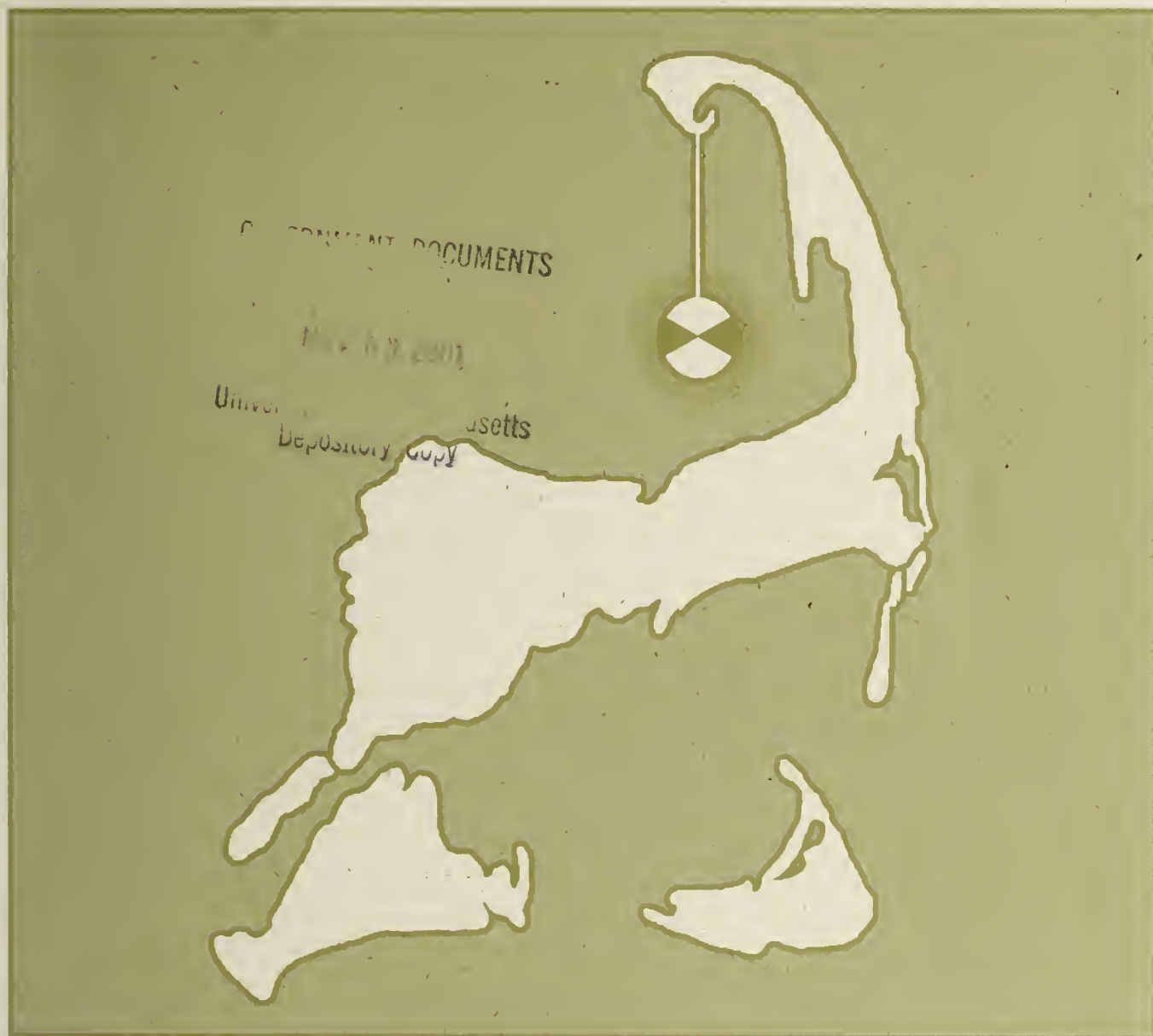


MASS. WBI.2:D62



# Directory of Citizen Water Quality Monitoring Programs on Cape Cod and the Islands



Waquoit Bay National Estuarine Research Reserve  
2000



# Directory of Citizen Water Quality Monitoring Programs on Cape Cod and the Islands

NC

*Compiled by:*

William Flender

*Edited By:*

Reserve Staff

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2000



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## Introduction

This directory provides a brief glance at the work of hundreds of people on Cape Cod and the Islands--from volunteer water quality monitors and program coordinators, to scientists and coastal decision makers. Able to monitor frequently and at many sites, citizens provide a wealth of long-term data about the health of our lakes, rivers, and estuaries. As threats to water quality on the Cape and Island increase, and resources available to environmental agencies and scientists continue to dwindle, the information available through the efforts of concerned volunteers becomes increasingly important in coastal planning and research.

There is increasing recognition of the need for bringing together individual water quality monitoring groups to share ideas and resources. In addition, potential data users need to be made aware of the activities and expertise of citizen water quality monitoring groups. We hope to help bridge existing gaps in communication and awareness by providing information about the region's citizen water quality monitoring programs to: 1) water quality monitoring coordinators, 2) town, state, and federal officials, and 3) aquatic scientists.

As citizen water quality monitoring continues to grow on Cape Cod and the Islands--both in numbers of volunteers and in importance--so does the size and length of this document.

## Acknowledgements

Production of this document was made possible by a grant from the Massachusetts Executive Office of Environmental Affairs Watershed Initiative, the National Oceanic and Atmospheric Administration, through the National Estuarine Research Reserve System, and by the Massachusetts Department of Environmental Management. The information contained within the directory was provided and reviewed by the groups listed.

# Abbreviations and Acronyms

## Agencies, Organizations, and Computer Systems

BBP	Buzzards Bay Project
BLT	Barnstable Land Trust
CBB	Coalition for Buzzards Bay
CCNS	Cape Cod National Seashore
CFCC	Community Foundation of Cape Cod
CZM	Massachusetts Coastal Zone Management Program
DEP	Massachusetts Department of Environmental Protection
EPA	US Environmental Protection Agency
FACES	Falmouth Associations Concerned About Estuaries and Salt Ponds
GIS	Geographic Information System
MBL	Marine Biological Laboratory
MWRA	Massachusetts Water Resources Authority
QAPP	Quality Assurance Project Plan
UMass-D	University of Massachusetts-Dartmouth
WBNERR	Waquoit Bay National Estuarine Research Reserve
WHOI	Woods Hole Oceanographic Institution
CMAS	UMass Center for Marine Science & Technology

## Parameters and Methods

BOD	Biological Oxygen Demand
CHN	Carbon-Hydrogen-Nitrogen
CTD	Conductivity-Temperature-Depth
DO	Dissolved Oxygen
POC	Particulate Organic Carbon
PON	Particulate Organic Nitrogen
TON	Total Organic Nitrogen
YSI	Yellow Springs Instruments



Cape Cod & the Islands Citizen Water Quality Monitoring Groups



Provincetown Harbor Water Quality Monitoring Program

Orleans Marine Water Quality Monitoring Task Force

Wheeler Road Association & Friends

Barnstable Land Trust

Shawme Ponds Watershed Association

Cataumet Civic Association

Lawrence School

Buzzards Bay Bay Watchers

Falmouth Pond Watchers

UMass Cooperative Extension - Martha's Vineyard

Garretts Pond Watchers

Pleasant Bay Alliance

Chatham High School

Chatham Water Watchers

Wequaquet Lake Association

Waqoit Bay Watchers

Harwich Shellfish & Marine Water Quality Monitoring Committee

Three Bays Monitoring Program

Cotuit Waders

Wampanoag Tribe of Aquinnah

Nantucket Environmental Laboratory







# Barnstable Land Trust

**Principal Advisor(s):** Dr. Dale Saad, Jaci Barton  
**Volunteer Trainer:** Dr. Dale Saad  
**Affiliated Program(s):** Barnstable Land Trust, Town of Barnstable

**Staff:** 2  
**Active Volunteers:** 9  
**Year Founded:** 1994  
**Last update submitted:** 2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Marston Mills River	F/M/R	12	Barnstable (Marstons Mills)
Prince Cove	E/M		

**Sampling Season:** April - December  
**Frequency of Sampling:** Once/2 weeks  
**Time of Sampling:** 4-6 pm  
**Reason for Time:** volunteer convenience; tidal cycle; late enough to meet sample holding requirements for next morning lab analysis

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☒  
**Methods Manual:** ☒  
**Lab:** Town of Barnstable  
**Volunteer Retraining:** Yes  
**Software:** Excel, GIS, Access, Word  
**Data Entry:** Dale Saad  
**Data Analysis:** Dale Saad  
**Data Products:** Trends-graphs, spreadsheets, Resources newsletter

## Reasons for Sampling/Program Information

Barnstable Land Trust volunteers monitor the Marston Mills River and its tidal estuary, Prince Cove, to collect baseline information about the health of the ecosystem and to assess sources of contamination causing shellfish bed closures.

Nutrients are measured occasionally, or when a problem (algae bloom or foul odor) is noted.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
MA Department of Marine Fisheries	Scheduling shellfish sanitary surveys to allow shellfish bed openings
Town of Barnstable	Research, problem identification, education
Barnstable Land Trust	Education

# Barnstable Land Trust

Parameter	Method	Detection Limit	Precision
Water Temperature	Thermometers	0.2 C	
Dissolved Oxygen	LaMotte DO Kits and meter	0.2 ppm	
pH	Orion or Hach meter (Barnstable Town Lab)		
Turbidity	Secchi disk		
Fecal Coliform Bacteria	Membrane filtration MTEC (Barnstable Town Lab)	0.5 cfu/100ml	
E. Coli Bacteria	Membrane filtration with urease test (Barnstable Town Lab)	0.5 cfu/100ml	
Nitrate-Nitrogen	Hach Nitrate Kits		
Phosphate	Hach Phosphate Kits	0.01 ppm	
Air Temperature	Thermometers	0.2 C	
Weather, rainfall, winds	Observations		

## Funding

Annual Budget:

### Percent Funding by Source:

Federal:

State:

Town: 70%

Dues:

Foundation: Part

Business: Part

Other: Part (individuals)

## Public Events/Outreach

Resources (newsletter)

River Day

## Contacts

Barnstable Land Trust

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FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:



# Buzzards Bay Citizen Monitoring Program

<b>Principal Advisor(s):</b>	Tony Williams (CBB), Dr. Brian Howes (CMAST)	<b>Staff:</b>	2
<b>Volunteer Trainer:</b>	Tony Williams	<b>Active Volunteers:</b>	80-100
<b>Affiliated Program(s):</b>	Coalition for Buzzards Bay (CBB), CMAST-Umass Dartmouth, Buzzards Bay Project (BBP), MWRA, Lloyd Center	<b>Year Founded:</b>	1992
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
28 Embayments of Buzzards Bay	E/M/F/R	200	Bourne, Dartmouth, Fairhaven, Falmouth, Gosnold, Marion, Mattapoisett, New Bedford, Wareham, Westport, Acushnet

<b>Sampling Season:</b>	May-September (nutrients: July-August)
<b>Frequency of Sampling:</b>	Weekly
<b>Time of Sampling:</b>	6-9am on scheduled days; nutrients on last 3 hours of ebb tide; during and following rain events
<b>Reason for Time:</b>	To capture daily minimum oxygen concentrations, nutrient loads

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input checked="" type="checkbox"/>
<b>Methods Manual:</b>	<input checked="" type="checkbox"/>
<b>Lab:</b>	Umass-Dartmouth, Barnstable County
<b>Volunteer Retraining:</b>	Annual
<b>Software:</b>	QuattroPro, Pagemaker
<b>Data Entry:</b>	CBB, BBP, WRWA, & UMass-Dartmouth staff
<b>Data Analysis:</b>	CBB, BBP, WRWA, & UMass-Dartmouth staff
<b>Data Products:</b>	5 parameters used to rank embayments by health index, baywatcher reports, poster

## Reasons for Sampling/Program Information

The US EPA has designated Buzzards Bay an estuary of significance. Parameters being monitored were chosen to investigate nutrient loading, a primary threat to the estuary, as identified in the Buzzards Bay Comprehensive Plan.

The Coalition for Buzzards Bay, the Buzzards Bay Project and other associations, occasionally collaborate on monitoring upstream sources of fecal coliform bacteria.

The Coalition for Buzzards Bay is working with the towns in the Buzzards Bay watershed to help develop nitrogen management and pollution control actions for each embayment.

The Coalition for Buzzards Bay is working with CMAST Coastal Research Group to implement comprehensive monitoring for restoration of the bay's most threatened and degraded areas.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Local government (towns around Buzzards Bay)	Development of town nitrogen management plans
State government	Sewage treatment facility permits
Coalition for Buzzards Bay	Education of coastal decision makers and the public
Scientists	Research, evaluation of nitrogen loading recommended actions, restoration efforts, WWTF upgrades, permitting, project funding

# Buzzards Bay Citizen Monitoring Program

Parameter	Method	Detection Limit	Precision
Temperature	Thermometer	0.5C	0.5C
Salinity	Hydrometer (1.000-1.050 specific gravity)	0.5 ppt	1.0 ppt
Dissolved Oxygen	Hach Kit OX-2P (modified Winkler titration)	0.5 ppm	0.5 ppm
pH			
Clarity	Secchi disk		
Fecal Coliform Bacteria	Membrane filtration- MTEC (Barnstable County Lab)		
Nitrate-Nitrogen	Lachat Autoanalyzer (Umass-D)	1 ug/L	>1%
Ammonium-Nitrogen	4-dophenol method (Umass-D)	1 ug/L	>1%
PON	CHN elemental analyzer (Umass-D)	10 ug/L	1%
DON	CHN elemental analyzer (Umass-D)		
Phosphate	Molybdenum Blue (Umass-D)	1 ug/L	>1%
POC	CHN elemental analyzer (Umass-D)	10 ug/L	1%
Total Suspended solids	Filtration/drying (Umass-D)		
Chlorophyll a	Spectrophotometric-cold 90% acetone extraction, acid correction (Umass-	1 meq/L	
Copper			
Zinc			
Cadmium			
24 hr. precipitation, weather, wind, Beaufort scale, tide	Observations		

## Funding

Annual Budget: \$110,565

### Percent Funding by Source:

Federal:

State: 80%

Town:

Dues:

Foundation:

Business:

Other: 20%

## Public Events/Outreach

Report and Poster  
 Buzzards Bay Current (newsletter)  
 Board of Directors Meetings  
 Local Marine Events  
 Coastal Caucus  
 Great American Secchi Dip-in  
 Web Site  
 Baywatchers Report  
 Meetings with town officials to discuss nitrogen management  
 National Volunteer Monitoring Conference  
 Workshops and Lectures

## Contacts

Coalition for Buzzards Bay

Tony Williams

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New Bedford, MA 02740-

Umass-Dartmouth

Brian Howes

Center for Marine Science and Technology

New Bedford MA 02744-

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Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:



# Cataumet Civic Associates

<b>Principal Advisor(s):</b>	George Seaver	<b>Staff:</b>	0
<b>Volunteer Trainer:</b>		<b>Active Volunteers:</b>	2
<b>Affiliated Program(s):</b>	Cataumet Civic Associates	<b>Year Founded:</b>	1988
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Squeteague Harbor, Scotch, House Cove, (Red Brook Harbor)	E/M	2	Cataumet (Bourne)
Groundwater	G/F	1	

<b>Sampling Season:</b>	Year-round
<b>Frequency of Sampling:</b>	4/year (once per season)
<b>Time of Sampling:</b>	Low tide, sunrise
<b>Reason for Time:</b>	Characterize diurnal "worst case conditions" for dissolved oxygen (before photosynthesis begins for the day)

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input type="checkbox"/>
<b>Methods Manual:</b>	<input type="checkbox"/>
<b>Lab:</b>	Marine Biological Laboratory
<b>Volunteer Retraining:</b>	none
<b>Software:</b>	Grapher, Qpro
<b>Data Entry:</b>	Entered to MBL database
<b>Data Analysis:</b>	Cataumet Civic Association
<b>Data Products:</b>	Graphs (by Cataumet Civic Association)

### Reasons for Sampling/Program Information

Squeteague Harbor is subject to impacts from cranberry bog discharges, leaching from failing septic systems, and resident flocks of geese. Red Brook Harbor has blooms of algae and macrophytes. Also the area is downgradient from the Massachusetts Military Reservation landfill. Monitoring is done to investigate potential nutrient loading and eutrophication and to create baseline data against which to measure the effects of future development in the watershed. The long term data set has provided baseline information with which to evaluate the effects of the LF-1 Plume from the Massachusetts Military Reservation.

## Data Uses

Data User	Data Use
Local government	Input into USGS & AFCEE numerical model flow computer model
Scientists (MBL)	Research-shellfish development studies
Catamet Civic Association	Problem identification, baseline data, habitat restoration, education
AFCEE	Percent discharge of aquifer prior to harbor

# Cataumet Civic Associates

Parameter	Method	Detection Limit	Precision
Temperature	Thermometer/thermistor	0.2 C	
Salinity	Solomat Water Test Equipment (SWTE) (MBL)	0.01 ppt	
Conductivity	SWTE (MBL)	0.01 mS	
Dissolved Oxygen	SWTE (MBL)	0.01 ppm	
pH	SWTE (MBL)	0.01	
Turbidity	SWTE (MBL)	0.1 ntU	
Nitrate-Nitrogen	Hach Co. Chemical Reagents (MBL)	0.01 mg/L	
Ammonia-Nitrogen	Hach Co. Chemical Reagents (MBL)	0.001 mg/L	
Phosphate	Hach Co. Chemical Reagents (MBL)	0.01 mg/L	
Copper	Hach Co. Chemical Reagents (MBL)	0.01 mg/L	
Sulphur	Hach Co. Chemical Reagents (MBL)	0.1 mg/L	

## Funding

Annual Budget: \$600

### Percent Funding by Source:

Federal:

State:

Town:

Dues: 100%

Foundation:

Business:

Other:

## Public Events/Outreach

Monthly Cataumet Civic Associates meeting

Board of Directors meeting

Cataumet Civic Associates newsletter

Selected topic reports

## Contacts

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Cataumet, MA 02534-

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WWW:

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FAX:  
Email:  
WWW:

# Chatham Water Watchers

<b>Principal Advisor(s):</b>	Dr. Robert Duncanson	<b>Staff:</b>	1
<b>Volunteer Trainer:</b>	Dr. Robert Duncanson	<b>Active Volunteers:</b>	100+
<b>Affiliated Program(s):</b>	Town of Chatham Water Quality Laboratory	<b>Year Founded:</b>	1998
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Taylor's Pond/Mill Creek, Bucks Creek Sulphur Springs	E/M	4	Chatham
Stage Harbor Complex, Bassing Harbor Complex, Chatham Harbor	E/M	12	Chatham
Muddy Creek	E/F	1	Chatham/Harwich
Nantucket Sound	M	1	Chatham

<b>Sampling Season:</b>	May-October
<b>Frequency of Sampling:</b>	May, Sept. Oct. once/month, June-Aug. once/2 weeks
<b>Time of Sampling:</b>	6-9am
<b>Reason for Time:</b>	worst case dissolved oxygen

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input checked="" type="checkbox"/>
<b>Methods Manual:</b>	<input checked="" type="checkbox"/>
<b>Lab:</b>	CMAST (nutrients)
<b>Volunteer Retraining:</b>	Annual
<b>Software:</b>	Excel, Sigma Plot
<b>Data Entry:</b>	Laboratory Assistant
<b>Data Analysis:</b>	Laboratory Assistant
<b>Data Products:</b>	Long-term database, yearly reports, multi year comparisons

## Reasons for Sampling/Program Information

The Town of Chatham Water Quality Laboratory in cooperation with the Friends of Chatham Waterways, a local advocacy group, formed the "Chatham Water Watchers". The CWW is dedicated to providing the Town and its citizens with comprehensive, accurate, and reliable data about estuarine and near-shore water quality conditions in Chatham.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Local Government	Education, planning, remediation, preservation
Local Citizens	Advocacy
Scientists	Research, anthropogenic impact assessment, restoration

# Chatham Water Watchers

Parameter	Method	Detection Limit	Precision
Dissolved Oxygen	YSI Model 550 Meter	0.1mg/L	0.1mg/L
Water Temperature	YSI Model 550 Meter	0.1 C	0.1 C
Water Clarity	Secchi Disk	0.1 M	
Total Water Depth	Secchi Disk	0.1 M	
Weather, wind speed, direction, water conditions	Observations		
Salinity	Refractometer	1ppt	1ppt
Nutrients	CMAST Laboratory		
Chlorophyll a/Pheophytin	CMAST Laboratory		

## Funding

Annual Budget: Approx. \$5,000

### Percent Funding by Source:

Federal:

State:

Town: 100%

Dues:

Foundation:

Business:

Other: EOEA Grants

## Public Events/Outreach

Poster Displays  
Volunteer Get-Togethers  
Newspaper Articles  
Summary Documents

## Contacts

Town of Chatham Water Quality Laboratory  
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Martha Stone

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WWW:  
Phone: (508) 945-3686  
FAX:  
Email:  
WWW:  
Phone: (508) 945-2716  
FAX:  
Email:  
WWW:

# Cotuit Waders

**Principal Advisor(s):** Brian Howes, Dale Saad  
**Volunteer Trainer:** Brian Howes, Tom Bourne  
**Affiliated Program(s):** Mashpee Watershed Sampling Program

**Staff:** 0  
**Active Volunteers:** 10  
**Year Founded:** 1997  
**Last update submitted:** 2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Santuit River/Quaker Run	R	5	Barnstable/Mashpee
Shoestring Bay	E	3	Barnstable/Mashpee
Popponesset Bay	E	1	Barnstable/Mashpee
Santuit Pond	L	1	Barnstable/Mashpee

**Sampling Season:** April - November  
**Frequency of Sampling:** Monthly  
**Time of Sampling:** Early morning, outgoing tides  
**Reason for Time:** Find minimum DO

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☒  
**Methods Manual:** ☒  
**Lab:** Barnstable County, UMASS CMAST  
**Volunteer Retraining:** Dr. Brian Howes, Dr. Tom Bourne  
**Software:** Lotus/Excel  
**Data Entry:** Doug Kneale  
**Data Analysis:** Doug Kneale  
**Data Products:** Charts, spreadsheets

## Reasons for Sampling/Program Information

Evaluate Fecal Coliform Problems  
 Evaluate Algae Bloom Problems

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Town of Barnstable Board of Health	Fecal Coliform
UMASS CMAST	Watershed Wastewater Management studies
Barnstable/Mashpee Shellfish Dept.	Fecal Coliform

# Cotuit Waders

Parameter	Method	Detection Limit	Precision
Fecal Coliform Bacteria	Membrane filtration Mtec (Barnstable County)	10	
Colstridium		1	
Fecal Strep Bacteria	Membrane filtration MTEC (Barnstable County)	10	
Temperature	YSI meter	0.1 C	0.1 C
Salinity/Conductivity	YSI meter	0.1 ppt	2%
Clarity	Secchi disk		
Dissolved Oxygen	Winkler titration (Field and UMASS-D)	0.5 ppm	0.5 ppm
Total Suspended Solids (TSS)	UMASS-D		
Chlorophyll a	UMASS-D	1 meq/L	
PON	UMASS-D	10 us N/I	1%
POC	UMASS-D	10 ug C/L	1%
Orthophosphate	UMASS-D	1 ug/L	>1%
Nitrate Nitrogen	UMASS-D	1 ug/L	>1%
Ammonium-Nitrogen	UMASS-D	1 ug/L	>1%
Nitrite-Nitrogen	UMASS-D	1 ug/L	>1%

## Funding

Annual Budget: \$5000

### Percent Funding by Source:

Federal:

State: 70%

Town:

Dues: 30%

Foundation:

Business:

Other:

## Public Events/Outreach

Presentations at Cotuit-Santuit Civic Association general meetings

Presentations at Cotuit-Santuit Civic Association Executive Board meetings

Announcements in Cotuit-Santuit Civic Association Newsletter

Testify at hearings on new commercial developments

## Contacts

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Cotuit, MA 02635-

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WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:



# Falmouth Pond Watchers

<b>Principal Advisor(s):</b>	Dr. Brian Howes, Dale Goehringer	<b>Staff:</b>	2
<b>Volunteer Trainer:</b>	Dr. Brian Howes, Dale Goehringer	<b>Active Volunteers:</b>	80
<b>Affiliated Program(s):</b>	WHOI, FACES, Falmouth Conservation Commission, Falmouth Planning Board, UMass-Dartmouth	<b>Year Founded:</b>	1987
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Oyster, Green, Little, Bournes, & Great Ponds	E/M	34 total (surface and depth at 15 sites)	Falmouth
West Falmouth Harbor	E/M		Falmouth

**Sampling Season:** July-August

**Frequency of Sampling:** once/2 weeks

**Time of Sampling:** Sunday, 9-noon

**Reason for Time:** Consensus of volunteers, meets maximum holding time allowed for samples to be analyzed on Monday

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☐

**Methods Manual:** ☐

**Lab:** UMass-Dartmouth

**Volunteer Retraining:** Annual

**Software:** Lotus 123

**Data Entry:** UMass-Dartmouth staff

**Data Analysis:** UMass-Dartmouth staff

**Data Products:** Standard statistical analysis, annual reports

## Reasons for Sampling/Program Information

Primary Objectives of Falmouth Pond Watchers:

1. Provide Town of Falmouth with baseline of nutrient levels and associated water quality, relative to Coastal Overlay Bylaw;
2. Develop and evaluate various potential environmental management options for the pond;
3. Provide independent evaluation of impacts of human and natural alterations of water quality;
4. Evaluate effectiveness of implemented management plans;
5. Provide baseline water quality data to evaluate potential impacts of Falmouth Wastewater Treatment Plant nutrient plume on West Falmouth Harbor;
6. Create public awareness of human impacts on water quality.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Town of Falmouth	Local decision making, including determination and evaluation of nutrient bylaw
Scientists (UMass-Dartmouth)	Examination of sewage treatment effects on W. Falmouth harbor, nitrogen loading research, education

# Falmouth Pond Watchers

Parameter	Method	Detection Limit	Precision
Depth			
Water Temperature	Thermometer		
Salinity	Temp. Comp. American Optical Refractometer		
Dissolved Oxygen	Hach Kit	0.5 mg/L	
Water Clarity	Secchi disk		
Water Color			
Rainfall			
Pond state, weather	Observations		
Nitrate-Nitrogen	Lachat autoanalyzer (UMass-D)	1 ug/L	>1%
Nitrite-Nitrogen	Lachat autoanalyzer (UMass-D)	1 ug/L	>1%
Ammonium-Nitrogen	Indophenol Method (UMass-D)	1 ug/L	>1%
PON	CHN elemental analyzer (UMass-D)	10 ug N/L	1%
TON	Persulfate digest (UMass-D)		
POC	CHN elemental analyzer (UMass-D)		
Chlorophyll a	Spectrophotometric-cold 90% acetone extraction, acid correction (UMass-	1 meq/L	
Chloride	Buchler-Cotlov Potentiometric Titration Chlorinometer (UMass-D)		
Sulfide	(UMass-D)		
Phosphate	Molybdenum Blue (UMass-D)	1 ug/L	>1%

## Funding

Annual Budget: \$9,000 (varies)

### Percent Funding by Source:

Federal:

State: x (CZM)

Town: x

Dues:

Foundation:

Business:

Other: x (UMass-D)

## Public Events/Outreach

Reports

## Contacts

UMass-Dartmouth  
Brian Howes  
Center for Marine Science and Technology  
New Bedford, MA 02744-

Umass - Dartmouth  
Dale Goehringer  
Center for Marine Science and Technology  
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Phone:  
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Email:  
WWW:

Phone:  
FAX:  
Email:  
WWW:



# Garretts Pond Watchers

**Principal Advisor(s):** Dr. Dale Saad, Sue Phelan  
**Volunteer Trainer:** Dr. Dale Saad  
**Affiliated Program(s):** Town of Barnstable

**Staff:** 1  
**Active Volunteers:** 9  
**Year Founded:** 1995  
**Last update submitted:** 2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Garretts Pond	F/L	3	Barnstable

**Sampling Season:** May-September  
**Frequency of Sampling:** Once/month  
**Time of Sampling:** 1-3pm  
**Reason for Time:** Convenience, back to lab before 3:30pm, run same day

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☒  
**Methods Manual:** ☒  
**Lab:** Town of Barnstable  
**Volunteer Retraining:** Yes  
**Software:** Excel, Access, GIS, Word  
**Data Entry:** Dr. Dale Saad  
**Data Analysis:** Dr. Dale Saad  
**Data Products:** Trends-spreadsheets, graphs

## Reasons for Sampling/Program Information

Garretts Pond is monitored to collect baseline information about ecosystem health and potential nutrient loading. Testing for nitrate was suspended, since Garretts Pond empties into an estuary that does not seem to be nitrogen-sensitive. Phosphate measurements were retained to check for potential nutrient loading which could cause eutrophication in fresh water.

In 1997, Garretts Pond volunteers began participating in a joint US Geological Survey/volunteer remote-sensing (satellite) study of chlorophyll in Massachusetts' lakes.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Town of Barnstable	Local decision making, town planning
Citizens	Education
US Geological Survey	Ground-truthing of remote images of chlorophyll in Massachusetts' Lakes

# Garretts Pond Watchers

Parameter	Method	Detection Limit	Precision
Water Temperature	Thermometers	0.2 C	
Fecal Coliform Bacteria	Membrane filtration MTEC (Barnstable Town Lab)		
E. Coli Bacteria	Membrane filtration MTEC (Barnstable Town Lab)		
Phosphate	Hach Phosphate Kits		

## Funding

Annual Budget:

### Percent Funding by Source:

Federal:

State:

Town: 100%

Dues:

Foundation:

Business:

Other:

## Public Events/Outreach

## Contacts

Health Division, Town of Barnstable  
Dale Saad  
367 Main Street  
Hyannis, MA 02601-

Sue Phelan  
179 Plum Street  
Barnstable MA 02668-

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Email:

WWW:

Phone: (508) 362-5172

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

# Harwich Shellfish and Marine Water Quality Committee

Principal Advisor(s): Tom Leach  
 Volunteer Trainer:  
 Affiliated Program(s): Town of Harwich

Staff: 0  
 Active Volunteers: 7  
 Year Founded: 1996  
 Last update submitted: 2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Allen Harbor, Round Cove, Saquatucket Harbor, Pleasant Bay, Wychmere Harbor, Herring River, Muddy Creek, Red River	E/M	15	Harwich

Sampling Season: June-September  
 Frequency of Sampling: 5 times  
 Time of Sampling: mornings, 9-noon  
 Reason for Time: Get samples to Barnstable

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

QAPP: ☐  
 Methods Manual: ☐  
 Lab: Barnstable Lab  
 Volunteer Retraining:  
 Software: Lotus/Excel  
 Data Entry: Barnstable County Lab Staff  
 Data Analysis:  
 Data Products:

## Reasons for Sampling/Program Information

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Harwich Shellfish and Marine Committee	Exploration of shellfish bed restoration, development of stormwater remediation measures, water quality database

# Harwich Shellfish and Marine Water Quality Committee

Parameter	Method	Detection Limit	Precision
Water Temperature	Membrane filtration MTEC (Barnstable County Lab)		
Salinity			
Fecal Coliform			
Dissolved Oxygen			
Nitrate-Nitrogen			
Phosphate			
Clarity/Turbidity			
Weather	Observations		

## Funding

**Annual Budget: \$4500**

**Percent Funding by Source:**

**Federal:**

State:

Town: 100%

**Dues:**

### Foundation:

## Business:

**Other:**

### Public Events/Outreach

Harwich Shellfish &amp; Marine Water Quality Committee newsletter

## Contacts

## Shellfish and Marine Water Quality Committee

Tom Leach

715 Main Street

Harwichport, MA 02646-

**Phone:** (508) 430-7532

**FAX:** (508) 432-5039

**Email:** harbor@capecod.net

WWW:

Phone:

FAX:

Email:

**WWW:**

**Phone:****FAX:**

Email:

WWW:

**Phone:****FAX:**

Email:

**WWW:**

# Nantucket Environmental Laboratory

Principal Advisor(s): Tate Keogan  
 Volunteer Trainer: Tate Keogan  
 Affiliated Program(s): Nantucket Harbor Life, Inc.

Staff: 1  
 Active Volunteers: 6  
 Year Founded: 1995  
 Last update submitted: 1997

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Nantucket Harbor	E/M	12	Nantucket

Sampling Season: year round  
 Frequency of Sampling: once/week  
 Time of Sampling: low tide and after rain events  
 Reason for Time:

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

QAPP: ☒  
 Methods Manual: ☒  
 Lab: Nantucket Environmental Lab  
 Volunteer Retraining:  
 Software: Excel, Word, Clarisworks  
 Data Entry: Tate Keogan  
 Data Analysis: Tate Keogan  
 Data Products: Spreadsheets, line graphs

## Reasons for Sampling/Program Information

Nantucket Environmental Laboratory operates a coastal citizen's monitoring group. The goal of this program is to involve members of the community in order to educate the public and help protect and restore important coastal habitats and natural resources. The citizen's monitoring group measures parameters pertinent to shellfishing regulations, public health regulations, and the relative health of Nantucket Harbor waters. Monitored sites represent a spectrum of areas of concern within the harbor, including public beaches, productive shellfishing areas, storm drain outfalls, and Head of the Harbor where water quality has been poor for years.

Nantucket Environmental Laboratory is Massachusetts DEP certified for bacterial analyses.

## Data Uses

Data User	Data Use
Nantucket Environmental Laboratory	Determine annual trends in local water quality, research
Local Government	Local decision making, examination of trends in water quality

# Nantucket Environmental Laboratory

Parameter	Method	Detection Limit	Precision
Water Temperature	Thermometers		
Salinity	Refractometer		
Conductivity	Fisher Accumet 50 meter		
Dissolved Oxygen	ATI Orion meter		
pH	Fisher Accumet 50 meter		
Water Clarity	Secchi Disk		
Fecal Coliform Bacteria	Membrane Filtration (Nantucket Environmental Lab)		
E. Coli Bacteria	Membrane Filtration (Nantucket Environmental Lab)		
Total Coliform Bacteria	Membrane Filtration (Nantucket Environmental Lab)		
Nitrate-Nitrogen	Colorimeter		

## Funding

**Annual Budget:**

### Percent Funding by Source:

**Federal:**

**State:**

**Town:**

**Dues:**

**Foundation:** Community Found. Of Cape Cod

**Business:**

**Other:** Private Donations, income from analytical testing

## Public Events/Outreach

Great American Secchi Dip-in.

## Contacts

Nantucket Harbor Life  
Tate Keogan  
PO Box 1419  
Nantucket, MA 02554

**Phone:** (508) 228-1338

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**Email:**

**WWW:**

**Phone:**

**FAX:**

**Email:**

**WWW:**

**Phone:**

**FAX:**

**Email:**

**WWW:**

**Phone:**

**FAX:**

**Email:**

**WWW:**



# Orleans Marine Water Quality Monitoring Task Force

**Principal Advisor(s):** Donald Power, Chairman

**Staff:**

**Volunteer Trainer:** Jenny Wood, Bob Royce, Dwight Wilson, Bob and Peg Wineman

**Active Volunteers:**

**Affiliated Program(s):** Town of Orleans

**Year Founded:** 1988

**Last update submitted:** 2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Nauset Harbor, Pleasant Bay, Cape Cod Bay	E/M	30 (+ data from 70 DMF sites)	Orleans
5 Salt Ponds in Pleasant Bay*	E/M	10	Orleans

<b>Sampling Season:</b>	Remediation Monitoring May-October	*Nutrient Monitoring April-November
<b>Frequency of Sampling:</b>	Once/17 Days	2/mo.-May & June, 1/mo.-July-November.
<b>Time of Sampling:</b>	Morning low tide	Half-tide, outgoing
<b>Reason for Time:</b>	Sampling sites accessible only at low tide, timely transport to split samples to county lab	

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input type="checkbox"/>
<b>Methods Manual:</b>	<input type="checkbox"/>
<b>Lab:</b>	Task Force, CCNS, Barnstable County, UMass-D
<b>Volunteer Retraining:</b>	Annual; peer training for new volunteers
<b>Software:</b>	Alpha Four, Stat Most
<b>Data Entry:</b>	Volunteers
<b>Data Analysis:</b>	Volunteers
<b>Data Products:</b>	Quarterly & annual site reports on Town & DMF findings, reports to Orleans Task Force, graphs

## Reasons for Sampling/Program Information

The Program is directed toward accomplishing three main program categories.

**Remediation Program:** Identification of problem run-off areas in Orleans estuaries, Nauset Harbor, Cape Cod Bay, 1988-date, and adoption of management practices or installation of retention and/or infiltration systems to remediate conditions.

**Nutrient Program:** Longitudinal assessment of nutrient levels in Pleasant Bay estuaries (1988-date) and recommendation of land use and other management practices to protect or improve the quality of these waters. This program has been folded into the tri-town Pleasant Bay Resource Management Alliance.

**Fresh Water Studies:** A new program has been initiated for base-line study of nutrient and bacteriological levels in selected Orleans fresh water lakes and ponds.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Town of Orleans	Funding of remediation programs, shellfish harvesting, regulated land uses
Pleasant Bay Plan & Orleans Task Force	Establishing baseline information and monitoring changes in the upper reaches of Pleasant Bay
	Education

# Orleans Marine Water Quality Monitoring Task Force

Parameter	Method	Detection Limit	Precision
Depth (field)	Secchi disk		
Water Temperature (field)	Enviro-safe thermometers	-5 to 50 C	0.5 C
Salinity (lab)	Graphic conversion from conductivity		
Conductivity (lab)	Conductivity meter		
pH (lab)	Corning Check Mite Portable pH Meter, pH-30	0-14	0.2
Fecal Coliform Bacteria (lab)	Membrane filtration (Task Force Lab)		
	Membrane filtration (Barnstable County Lab)		
Dissolved Oxygen (field)	Hach kit, Cororimetric	1-15 mg/L	0.2 mg/l
Nitrate-Nitrogen (lab)	LaMotte kit, Cororimetric	0-15 ppm	1 ppm
Nitrate-Nitrogen (lab)	Auto analysis (CCNS)		
Ammonia-Nitrogen (lab)	Auto analysis (CCNS)		
Phosphate (lab)	Auto analysis (CCNS)		
PON (lab)	CHN elemental analysis (UMass-D)		
POC (lab)	CHN elemental analysis (UMass-D)		
Chlorophyll a (lab)	Spectrophotometric-cold 90% acetone extraction, acid correction (UMass-	1 mcg/l	

## Funding

Annual Budget: \$5164 (1997)

### Percent Funding by Source:

Federal: 50% (CZM)

State:

Town: 50% (town of Orleans)

Dues:

Foundation:

Business:

Other:

## Public Events/Outreach

Annual public presentation to Town Selectmen

Newspaper articles

Presentations to interested monitoring organizations, citizens, and state officials

Great American Secchi Dip-In

## Contacts

Don Powers

Orleans, MA 02653-

Bob and Peg Wineman

Orleans MA 02653-

Judy Scanlon

Orleans MA 02653-

Phone:

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WWW:

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FAX:

Email:

WWW:

Phone:

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Email:

WWW:



# Pleasant Bay Alliance Citizen Quality Monitoring Program

<b>Principal Advisor(s):</b>	Dr. Robert Duncanson, Dr. Robert Wineman-	<b>Staff:</b>	1
<b>Volunteer Trainer:</b>	Dr. Robert Duncanson, Dr. and Mrs. Wineman, George Olmsted, Heinz Pr	<b>Active Volunteers:</b>	100
<b>Affiliated Program(s):</b>	Chatham Water Watchers, Orleans Marine Water Quality Task Force	<b>Year Founded:</b>	1999
		<b>Last update submitted:</b>	2000

## Sampling

<u><b>Waterbody</b></u>	<u><b>Type</b></u>	<u><b># of Sites</b></u>	<u><b>Town(s)</b></u>
Pleasant Bay	E/M	16	Orleans, Harwich, Chatham

**Sampling Season:** May-October  
**Frequency of Sampling:** Monthly  
**Time of Sampling:** 6-9am  
**Reason for Time:** worst case dissolved oxygen

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☒  
**Methods Manual:** ☒  
**Lab:** CMAST  
**Volunteer Retraining:** annual  
**Software:** Excel  
**Data Entry:** Volunteer  
**Data Analysis:** TBD  
**Data Products:** Long term data base, yearly reports, multi-year comparisons

## Reasons for Sampling/Program Information

The Pleasant Bay Citizen Water Quality Monitoring Program is an out-growth of the Pleasant Bay Resource Management Plan. The plan cites the lack of consistent, comprehensive and reliable water quality data as a serious gap in the information needed to effectively manage the Bay's natural resources, and public use of the Bay waters and shoreline. Program objectives are to:
 

- Provide background data on general water quality conditions in the Bay;
- Monitor nitrogen-loading trends by calculating the Eutrophication Index; and
- Analyze data for use in policy, regulatory and educational applications.

## Data Uses

<b>Data User</b>	<b>Data Use</b>
Pleasant Bay Alliance	Planning, education, remediation, preservation
Regional scientists	
Citizens	Advocacy

# Pleasant Bay Alliance Citizen Quality Monitoring Program

Parameter	Method	Detection Limit	Precision
Weather, wind force/direction, water conditions	Observations		
Water clarity and total depth	Secchi Disk	0.1 M	
Salinity	Refractometer	1 ppt	1 ppt
Dissolved Oxygen	DO Meter (YSI 550)	0.1mg/L	0.1mg/L
Temperature (water)	DO Meter (YSI 550)	0.1 C	0.1 C
Chlorophyll a/Pheophytin	Laboratory (CMAST)		
Nutrients:	Laboratory (CMAST)		
Dissolved inorganic nitrogen,			
Particulate organic nitrogen,			
Dissolved organic nitrogen,			
Particulate organic carbon,			
Orthophosphate			

## Funding

Annual Budget:

### Percent Funding by Source:

Federal:

State: 30%

Town: 20%

Dues:

Foundation: 50%

Business:

Other:

## Public Events/Outreach

Newspaper Articles

Direct Mailings

Presentations to Local Groups

## Contacts

Carole Ridley  
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East Harwich, MA 02645-

Town of Chatham Water Quality Laboratory  
Robert Duncanson  
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Chatham MA 02633-

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FAX: (508) 945-5163

Email: chathamlab@capecod.net

WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

# Provincetown Harbor Water Quality Monitoring Program

Principal Advisor(s): Tony Jacket

Staff: 1.5

Volunteer Trainer:

Active Volunteers: 14

Affiliated Program(s):

Year Founded: 1994

Last update submitted: 1997

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Provincetown Harbor	M	24 (16 intertidal; 8 subtidal top & bottom)	Provincetown
Groundwater	F	8	
Stormwater	F	4	

	Harbor & Groundwater:	Stormwater:
Sampling Season:	May-November	July-November
Frequency of Sampling:	once/2 weeks	varies
Time of Sampling:	morning ebb tide during 3 day period around neap tide	during rain events
Reason for Time:	characterize worst-case conditions and greatest loading from land: 3-day span for volunteer convenience	catch first flush from storm drains

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

QAPP:	<input type="checkbox"/>
Methods Manual:	<input checked="" type="checkbox"/>
Lab:	Provincetown Water Quality Lab, CCNS
Volunteer Retraining:	bi-annual
Software:	Word, Excel
Data Entry:	Research Assistant/intern
Data Analysis:	Research Assistant/Intern
Data Products:	Spacial and temporal trends graphs, tables, newsletters, webpage

## Reasons for Sampling/Program Information

Provincetown Harbor is heavily urbanized to the water's edge, with all homes on private septic systems. Large portions of the harbor are closed to shellfishing due to fecal coliform bacteria contamination. Monitoring provides baseline data about temporal and spacial water quality trends in the harbor, and targets those parameters which may be influenced by human activity on land.

In 1996 the Center for Coastal Studies added monitoring of nutrients and fecal coliform bacteria in groundwater entering the harbor. Monitoring stormdrain outfall pipes during rain events was added to the project in 1997.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Town of Provincetown	Local Decision making
Center for Coastal Studies	Research, education of volunteers

# Provincetown Harbor Water Quality Monitoring Program

Parameter	Method	Detection Limit	Precision
Water Temperature (h, g, s)	Thermometer (volunteers)	0.5 C	
	YSI 55 Dissolved oxygen meter (staff)	0.01 C	
	Seabird CTD (staff)	0.0001 C	
Salinity (h, g, s)	Hydrometer (volunteers)	0.1 ppt	
	YSI Conductivity Meter (staff)		
	Seabird CTD (staff)		
	Refractometer (staff)		
Dissolved Oxygen (h)	LaMotte Kits (azide modified Winkler titration)	0.2 ppm	
	YSI 55 DO Meter (staff)	0.01 ppm	
pH (h)	LaMotte Kits	1	
Fecal Coliform Bacteria (h, g, s)	Membrane Filtration-MFC (Provincetown Water Quality Lab)		
Nitrate-Nitrogen (h, g, s)	LaMotte Kits	1.0 ppm	
	Auto Analysis (CCNS Lab)		
Nitrite-Nitrogen (h, g, s)	Auto Analysis (CCNS Lab)	1.0 ppm	
Orthophosphates (g, s)	(CCNS Lab)		
Observations			
	h=Harbor Monitoring g=Groundwater Monitoring s=Stormwater Monitoring		

## Funding

Annual Budget: \$6,000 (1996)

### Percent Funding by Source:

Federal:

State: 25%

Town: 25%

Dues:

Foundation: 25%

Business:

Other: 25% (Center for Coastal Studies)

## Public Events/Outreach

Newsletters to volunteers

Web page

## Contacts

Town of Provincetown

Tony Jacket

Provincetown, MA 02657-

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

# Shawme Ponds Watershed Association; Inc.

<b>Principal Advisor(s):</b>	Gabrielle Belfit	<b>Staff:</b>	
<b>Volunteer Trainer:</b>		<b>Active Volunteers:</b>	8
<b>Affiliated Program(s):</b>	Upper Cape Cod Regional Technical School	<b>Year Founded:</b>	1999
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Upper and Lower Shawme Ponds	L	21	Sandwich

<b>Sampling Season:</b>	winter and summer
<b>Frequency of Sampling:</b>	once/month in winter, once every 2 weeks in summer
<b>Time of Sampling:</b>	varies with season, usually early morning, in summer and first flush on street drains
<b>Reason for Time:</b>	Minimum dissolved oxygen and pH in a highly eutrophic body of water. Noontime samples catch maximum values of dissolved oxygen and pH

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input type="checkbox"/>
<b>Methods Manual:</b>	<input type="checkbox"/>
<b>Lab:</b>	UMass Amherst for total phosphorus
<b>Volunteer Retraining:</b>	
<b>Software:</b>	Excel, Delta Graph, Claris Draw
<b>Data Entry:</b>	
<b>Data Analysis:</b>	
<b>Data Products:</b>	Parameter data base, graphs, maps

### Reasons for Sampling/Program Information

Determine cause of eutrophication and nutrient balance. The goal is to propose a management plan based on tradeoffs of cost, risk and results.

## Data Uses

Data User	Data Use
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# Shawme Ponds Watershed Association, Inc.

Parameter	Method	Détection Limit	Precision
Air Temperature	Thermometer		1.0 C
Water Temperature	YSI 55 Temp and DO Instrument		0.2 C
Dissolved Oxygen	YSI 55 Temp and DO Instrument		0.3mg/L
pH	LaMotte/Oakton pH Tester 2		0.1 pH unit
TDS	LaMotte/Oakton TDS Tester 3		micro-Sieme
Alkalinity	Hach Alkalinity Test Kit Model AL-AP	5 mg/L	5 mg/L
Total Phosphorus	UMass Amherst Lab		
Nitrate-Nitrogen	Hach DR-4000 Spectrophotometer at Upper Cape Tech		
Weather, rainfall, winds	Observations		

## Funding

Annual Budget:

### Percent Funding by Source:

Federal:

State: X

Town:

Dues:

Foundation:

Business:

Other: Grants, yard sales, individuals

## Public Events/Outreach

## Contacts

Charles Kleekamp  
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Sandwich MA 02563-

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Email: kleekamp@tiac.net

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FAX:

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WWW:

Phope:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

# Three Bays Water Quality Monitoring Program

**Principal Advisor(s):** Dr. Brian Howes  
**Volunteer Trainer:** George Hampson  
**Affiliated Program(s):** CMAST, Three Bays Preservation, Inc.

**Staff:** 2  
**Active Volunteers:** 20  
**Year Founded:** 1999  
**Last update submitted:** 2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
North Bay, Cotuit Bay and Nantucket Sound		6	Barnstable
West Bay, Brince Cove, Warrens Cove		6	Barnstable
Seaport River, Eel River		2	Barnstable
Marstons Mills River/Middle Pond, Mystic Lake		6	Barnstable

**Sampling Season:** Year Round  
**Frequency of Sampling:** 1 time per month  
**Time of Sampling:** 7-9 am  
**Reason for Time:** Lowest Dissolved Oxygen Conditions

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☒  
**Methods Manual:** ☒  
**Lab:** CMAST  
**Volunteer Retraining:** Annual  
**Software:**  
**Data Entry:**  
**Data Analysis:**  
**Data Products:**

## Reasons for Sampling/Program Information

As a result of public concern the Three Bay Water Quality Monitoring Program was initiated in 1999. In the collaborative effort, Three Bays Preservation Inc. provides the support, coordination and oversight of the program through its director, Lindsey Counsell and CMAST provides technical guidance, analytical support and data interpretation

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Government	Nutrient Management, Watershed Management
Scientists	Non-point source pollution assesment

# Three Bays Water Quality Monitoring Program

Parameter	Method	Detection Limit	Precision
Nitrate & Nitrite	Lachat Autoanalyzer (Umass-D)	1 ug/L	>1%
Ammonium	Indophenol method (Umass-D)	1 ug/L	>1%
DON	CHN elemental analyzer (Umass-D)		
PON	CHN elemental analyzer (Umass-D)	10 ug/L	1%
Total Dissolved Nitrogen			
Chlorophyll & Pheophytin a	Spectrophotometric-cold 90% acetone extraction, acid correction (Umass-	1 meq/L	
Phosphate	Molybdenum Blue (Umass-D)	1 ug/L	>1%
Oxygen Content	Winkler Titration		
Salinity	Hydrometer (1.000-1.050 specific gravity)	0.5 ppt	1.0 ppt
Chloride			
Periodic Sulfide			
Depth			
Temperature	Thermometer		
Clarity	Secchi disk depth		

## Funding

Annual Budget: \$250,000

### Percent Funding by Source:

Federal:

State:

Town:

Dues:

Foundation: \$125,000

Business:

Other: Fundraising: \$125,000

## Public Events/Outreach

## Contacts

Three Bays Preservation, Inc.  
Lindsey Counsell  
PO Box 215, 846C Main Street  
Osterville, MA 02655-

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Email: 3bays@cape.com  
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Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:



# University of Massachusetts Cooperative Extension, Martha's Vineyard

<b>Principal Advisor(s):</b>	Bill Wilcox	<b>Staff:</b>	2
<b>Volunteer Trainer:</b>	Bill Wilcox	<b>Active Volunteers:</b>	10
<b>Affiliated Program(s):</b>	UMass Cooperative Extension, Martha's Vineyard Retired Senior Volunteer Program Senior Environmental Corp	<b>Year Founded:</b>	1995
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Fresh Water Resources	E/M	35	Edgartown, Oak Bluffs, Tisbury, West Tisbury, Chilmark, Aquinnah

<b>Sampling Season:</b>	April-October, March, December
<b>Frequency of Sampling:</b>	Varies from once/2 weeks to once/month
<b>Time of Sampling:</b>	morning
<b>Reason for Time:</b>	Capture low oxygen state

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input checked="" type="checkbox"/>
<b>Methods Manual:</b>	<input type="checkbox"/>
<b>Lab:</b>	
<b>Volunteer Retraining:</b>	
<b>Software:</b>	Lotus
<b>Data Entry:</b>	UMass Cooperative Extension staff
<b>Data Analysis:</b>	UMass Cooperative Extension staff
<b>Data Products:</b>	

## Reasons for Sampling/Program Information

The University of Massachusetts Cooperative Extension is assembling this database as a basis for watershed management.

Crystal Lake is monitored to determine the effects of biomanipulation. A bacterial additive, which binds excess nutrients, has been introduced to the lake in an attempt to control algae blooms and eutrophication.

## Data Uses

<b>Data User</b>	<b>Data Use</b>
Local Government	Local decision making
Scientists	Nutrient loading evaluation, education

# University of Massachusetts Cooperative Extension, Martha's Vineyard

Parameter	Method	Detection Limit	Precision
Water Temperature	In field meter		
Salinity	In field meter		
Conductivity	In field meter		
Dissolved Oxygen	In field meter		
pH	In field meter		
Clarity	Secchi disk		
Nitrate-Nitrogen	Hach DR850 Colorimeter	0.01 mg/L	>1%
Ammonium-Nitrogen	Hach DR850 Colorimeter	0.01 mg/L	>1%
PON (only done occasionally)	CHN elemental analyzer	10 ug N/L	>1%
TON (only done occasionally)	Persulfate digestion		
Orotho Phosphate and Total Phophorus	Hach DR850 Colorimeter	0.01 mg/L	>1%
POC (only done occasionally)	Hach DR850 Colorimeter	10 ug N/L	1%
Chlorophyll a (only done occasionally)	Spectrophotometric-cold 90% acetone extraction, acid correction	1 meq/L	

## Funding

Annual Budget: \$10,000

### Percent Funding by Source:

Federal: 20% (RSVP)  
 State: 20% (UMass extension)  
 Town:  
 Dues:  
 Foundation: 60%  
 Business:  
 Other:

## Public Events/Outreach

Great American Secchi Dip-In

## Contacts

UMass Cooperative Extension  
 Bill Wilcox  
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 Oak Bluffs, MA 02557-  
 RSVP  
 Bill Walker

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 Phone: (508) 696-9010  
 FAX:  
 Email:  
 WWW:  
 Phone:  
 FAX:  
 Email:  
 WWW:

# Wampanoag Tribe of Aquinnah

<b>Principal Advisor(s):</b>	Matthew Vanderhoop	<b>Staff:</b>	3
<b>Volunteer Trainer:</b>	Matthew Vanderhoop, Jeff Day, Brett Stearns	<b>Active Volunteers:</b>	0
<b>Affiliated Program(s):</b>		<b>Year Founded:</b>	
		<b>Last update submitted:</b>	1997

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Menemsha, Squibnocket, Stonewall & Nashaquitsa Ponds	F/L (except during barrier beach breaches)	20	Aquinnah, Chilmark
<p><b>Sampling Season:</b> April-November</p> <p><b>Frequency of Sampling:</b> summer: once/2 weeks, winter:once/month</p> <p><b>Time of Sampling:</b> Varies. Dry weather: regular, approximately high tide, Wet weather: after 5 day dry spell, with .75" rain expected</p> <p><b>Reason for Time:</b></p>			

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input checked="" type="checkbox"/>
<b>Methods Manual:</b>	<input checked="" type="checkbox"/>
<b>Lab:</b>	Barnstable County, UMass-D
<b>Volunteer Retraining:</b>	N/A
<b>Software:</b>	Lotus, Paradox, MS Office
<b>Data Entry:</b>	Tribal Staff
<b>Data Analysis:</b>	Tribal Staff
<b>Data Products:</b>	

## Reasons for Sampling/Program Information

The Wampanoag Tribe of Gay Head-Aquinnah samples parameters most likely to affect shellfish populations.

## Data Uses

<b>Data User</b>	<b>Data Use</b>
Wampanoag Tribe of Gay Head-Aquinnah Scientists	
Local Government	

# Wampanoag Tribe of Aquinnah

Parameter	Method	Detection Limit	Precision
Temperature	YSI Sonde 6000		
Salinity	YSI Sonde 6000	0.1 ppt	0.2 ppt
Conductivity	YSI Sonde 6000	0.1 mS/cm	
Dissolved Oxygen	YSI Sonde 6000	1% air sat.	2% air sat.
pH	YSI Sonde 6000	0.01	0.2
Turbidity	YSI Sonde 6000	0.1 ntu	2 ntu
Fecal Coliform Bacteria	Membrane Filtration (Barnstable County Lab)		
Nitrate Nitrogen	Lachat autoanalyzer (UMass-D)	1 ug/L	>1%
Ammonium-Nitrogen	Indophenol method (UMass-D)	1 ug/L	>1%
PON	CHN elemental analyzer (UMass-D)	1 ug N/L	1%
TON	Persulfate digest (UMass-D)		
Chlorophyll a	Spectrophotometric-cold 90% acetone extraction, acid correction (UMass-D)	1 meq/L	
Plankton	Spp. Composition & abundance (UMass-D)		

## Funding

**Annual Budget:**

### Percent Funding by Source:

**Federal:** 100% (Sec. 106, CWA)

**State:**

**Town:**

**Dues:**

**Foundation:**

**Business:**

**Other:**

## Public Events/Outreach

## Contacts

Wampanoag Tribe of Aquinnah  
Matthew Vanderhoop  
20 Black Brook Road  
Aquinnah, MA 02535-

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**FAX:** (508) 645-3790

**Email:**

**WWW:**

**Phone:**

**FAX:**

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**Email:**

**WWW:**

**Phone:**

**FAX:**

**Email:**

**WWW:**

# Waquoit Bay Watchers

<b>Principal Advisor(s):</b>	Dr. Chris Weidman	<b>Staff:</b>	1
<b>Volunteer Trainer:</b>	David Giebtbrock, Research Assistant	<b>Active Volunteers:</b>	5
<b>Affiliated Program(s):</b>	Waquoit Bay National Estuarine Research Reserve	<b>Year Founded:</b>	1993
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Waquoit Bay, Eel Pond, Menahaut Inlet	E/M	3	Mashpee/Falmouth
Childs & Moonakis Rivers	R/E/M	2	Mashpee/Falmouth
Hamblin, Jehu & Eel Ponds	E/M	2	Mashpee/Falmouth

**Sampling Season:** Year-round (when not ice covered)  
**Frequency of Sampling:** summer: once/2 weeks; winter: once/month  
**Time of Sampling:** 7-9am  
**Reason for Time:** Characterize lowest dissolved oxygen conditions

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☐  
**Methods Manual:** ☒  
**Lab:** WBNERR Lab (Chl a)  
**Volunteer Retraining:** annual  
**Software:** Excel, Grapher  
**Data Entry:** Research assistant  
**Data Analysis:** Research assistant  
**Data Products:** Long-term database, plots comparing parameters and post on website

## Reasons for Sampling/Program Information

The Waquoit Bay Watchers are coordinated by the Waquoit Bay National Estuarine Research Reserve (WBNERR) which is part of a national system of Estuarine Research Reserves. A primary mission of WBNERR is to enhance the practice of coastal zone management by providing a link between the research community and the products of their endeavors to local and regional planning and regulatory authorities and to the public. A larger, national water quality monitoring project is underway at all NERR sites using automated data loggers to collect data, which is stored in a national database. The Bay Watchers program is an important part of the efforts to accomplish WBNERR's mission, and to establish a long-term water quality data set for the region.

## Data Uses

Data User	Data Use
State government	Education
Scientists	Research, non-point source pollution assessment, habitat restoration

# Waquoit Bay Watchers

Parameter	Method	Detection Limit	Precision
Water Temperature	Thermometer	0.5 C	
Salinity (specific gravity)	Hydrometer, LaMotte #3-0011	0.0005 SG	
Dissolved Oxygen	LaMotte Kit Model EDD (modified Wrinkler titr.)	0.2 ppm	
Clarity	Secchi disk		
Chlorophyll a	Acetone extraction & spectrophotometric analysis (WBNERR)		
Air Temperature	Thermometer	0.5 C	
Time, wind speed & direction, tide misc.	Observations		

## Funding

Annual Budget:

### Percent Funding by Source:

Federal: 80%

State: 20%

Town:

Dues:

Foundation:

Business:

Other:

## Public Events/Outreach

Open house and poster display at WBNERR

Annual volunteer social

Great American Secchi Dip-in

Newspaper articles

Newsletter articles

## Contacts

Waquoit Bay NERR

Chris Weidman

P.O. Box 3092

Waquoit, MA 02536-

Phone: (508) 457-0495

FAX: (617) 727-5537

Email: wbnerr@capecod.net

WWW: <http://www.capecod.net/waquoit>

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:



# Wequaquet Lake Protective Association

<b>Principal Advisor(s):</b>	Dale Saad, Gail Maguire	<b>Staff:</b>	1.
<b>Volunteer Trainer:</b>	Dale Saad, Gail Maguire	<b>Active Volunteers:</b>	16
<b>Affiliated Program(s):</b>	Wequaquet Lake Protective Association, Town of Barnstable	<b>Year Founded:</b>	1995
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Wequaquet Lake	L/F	13 total	Centerville (Barnstable)

Bearse Pond L/F

<b>Sampling Season:</b>	Year round (when not ice covered)
<b>Frequency of Sampling:</b>	once/month
<b>Time of Sampling:</b>	1-4pm, last Sunday of month
<b>Reason for Time:</b>	Volunteer convenience, appropriate holding time before sample analysis Monday morning

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input checked="" type="checkbox"/>
<b>Methods Manual:</b>	<input checked="" type="checkbox"/>
<b>Lab:</b>	Town of Barnstable
<b>Volunteer Retraining:</b>	Yes
<b>Software:</b>	Excel, GIS, Access, Word
<b>Data Entry:</b>	Dale Saad
<b>Data Analysis:</b>	Dale Saad
<b>Data Products:</b>	Trends, Graphs, Spreadsheets

## Reasons for Sampling/Program Information

Wequaquet Land and Bearnse Pond are subject to many of the the same impacts as other waterbodies on Cape Cod. The land surrounding the lakes is residential, with all houses on private septic systems, leading to a high probability of nutrient loading from failing septic systems. A single outfall pipe drains into Wequaquet Lake from a very large upland area. Wequaquet is also heavily used for boating, fishing, and swimming. These potential non-point pollution sources are compounded by Wequaquet's Lake flushing rate 2.5 years, and by Bearnse Pond's longer retention time.

In addition to concerns about non-point pollution considerations, residents are also concerned about fluctuations in lake level, loss of water lillies, the appearance of new aquatic plants, and spring blue-green algae blooms.

In 1997, Wequaquet Lake & Bearnse Pond volunteers began participating in a joint US Geological Survey/volunteer remote-sensing study of chlorophyll in Massachusetts lakes. Also examining Bearnse Pond Weed Problem.

## Data Uses

<b>Data User</b>	<b>Data Use</b>
Town of Barnstable	Local decision making
Wequaquet Lake Preservation Society	Education
US Geological Surevey	Ground-truthing of remote images of chlorophyll in Massachusetts lakes

# Wequaquet Lake Protective Association

Parameter	Method	Detection Limit	Precision
Water Temperature	Thermometers		
Dissolved Oxygen	Meter		
pH	Barnstable Town Lab		
Clarity	Secchi Disk		
Fecal Coliform Bacteria	Membrane filtration MTEC (Barnstable Town Lab)		
E. Coli Bacteria	Membrane filtration MTEC with urease test (Barnstable Town Lab)		
Phosphate	Hach Phosphate Kits		
Fauna presence, water color, rain within 48 hrs.	Observations		

## Funding

**Annual Budget:**

### Percent Funding by Source:

**Federal:**

**State:**

**Town:** 80%

**Dues:** Part

**Foundation:** Part

**Business:** Part

**Other:** Part

## Public Events/Outreach

Wequaquet Lake Preservation Society Newsletter

Great American Secchi Dip-In

## Contacts

Health Division, Town of Barnstable

Dale Saad

367 Main Street

Hyannis, MA 02601-

Wequaquet Lake Protective Association

Gail Maruire

56 Nyes Neck Road

Centerville MA 02632-

**Phone:** (508) 862-4644

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**FAX:**

**Email:**

**WWW:**

**Phone:**

**FAX:**

**Email:**

**WWW:**

**Phone:**

**FAX:**

**Email:**

**WWW:**

# Wheeler Road Association and Friends

<b>Principal Advisor(s):</b>	Dr. Dale Saad, Marge Sidman, Alex Frazee	<b>Staff:</b>	1
<b>Volunteer Trainer:</b>	Dale Saad	<b>Active Volunteers:</b>	6
<b>Affiliated Program(s):</b>	Wheeler Road Association & Friends, Town of Barnstable	<b>Year Founded:</b>	1995
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Mystic Pond	L/F	3	Marstons Mills (Barnstable)
Middle Pond	L/F	3	

**Sampling Season:** April-November  
**Frequency of Sampling:** twice/month  
**Time of Sampling:** 4-6pm, Tuesdays  
**Reason for Time:** Convenience, allowable holding time before sample analysis on Wednesday morning

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☒  
**Methods Manual:** ☒  
**Lab:** Town of Barnstable  
**Volunteer Retraining:** Annual  
**Software:** Excel, GIS, Access, Word  
**Data Entry:** Dale Saad  
**Data Analysis:** Dale Saad  
**Data Products:** Trends, Graphs, Spreadsheets

## Reasons for Sampling/Program Information

Sampling on Mystic and Middle Ponds provides baseline data about nutrient loading, bacterial contamination, and the general health of the aquatic ecosystems.

In 1997, Mystic and Middle Ponds volunteers began participating in a joint US Geological Survey/volunteer remote sensing (satellite) study of chlorophyll in Massachusetts lakes.

Part of the Marstons Mills River System Program.

## Data Uses

<u>Data User</u>	<u>Data Use</u>
Town of Barnstable	Local decision-making & town planning
Citizens	Education
US Geological Survey	Ground-truthing of remote images of chlorophyll in Massachusetts lakes.

# Wheeler Road Association and Friends

Parameter	Method	Detection Limit	Precision
Temperature	Thermometers		
Dissolved Oxygen	Meter		
Clarity	Secchi Disk		
Fecal Coliform Bacteria	Membrane filtration MTEC (Barnstable Town Lab)		
E. coli Bacteria	Membrane filtration MTEC with urease test (Barnstable)		
Nitrate-Nitrogen	Hach Nitrate Kits		
Phosphate	Hach Phosphate Kits		

## Funding

Annual Budget:

### Percent Funding by Source:

Federal:

State:

Town: 100%

Dues:

Foundation:

Business:

Other:

## Public Events/Outreach

River Day

Great American Secchi Dip-In

## Contacts

Health Division, Town of Barnstable

Dale Saad

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Hyannis, MA 02601-

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WWW:

Marge Sidman

376 Wheeler Road

Marstons Mills MA 02648-

Phone: (508) 428-2523

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WWW:

Alex Frazee

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Marstons Mills MA 02648-

Phone: (508) 428-2485

FAX:

Email:

WWW:

Phone:

FAX:

Email:

WWW:

School  
Water Quality Monitoring  
Programs





# Chatham High School

<b>Principal Advisor(s):</b>	Jean Avery, Gina Del Sesto	<b>Staff:</b>	2
<b>Volunteer Trainer:</b>	Jean Avery, Gina Del Sesto	<b>Active Volunteers:</b>	36
<b>Affiliated Program(s):</b>	Town of Chatham Water Quality Laboratory	<b>Year Founded:</b>	1994
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Frost Fish Creek	E/M	3	Chatham

<b>Sampling Season:</b>	October-December, March-May
<b>Frequency of Sampling:</b>	once/week
<b>Time of Sampling:</b>	varies
<b>Reason for Time:</b>	dependent upon time of class

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

<b>QAPP:</b>	<input type="checkbox"/>
<b>Methods Manual:</b>	<input type="checkbox"/>
<b>Lab:</b>	Town of Chatham Water Quality Lab
<b>Volunteer Retraining:</b>	annual
<b>Software:</b>	Vernier-Graphical Analysis, MS Word
<b>Data Entry:</b>	students
<b>Data Analysis:</b>	students
<b>Data Products:</b>	yearly report

## Reasons for Sampling/Program Information

This study was first undertaken by the chemistry students and their teacher, Jean Avery, in the fall of 1994 and has continued with improvements each year as part of the chemistry curriculum. The water quality project monitors the waters of Pleasant Bay in Chatham. The Frost Creek Water Quality Project is carried out under the direct supervision of Jean Avery, science teacher in partnership with the Pleasant Bay Resource Management Alliance under the guidance of Dr. Robert Duncanson. Students originally designed the study to determine if predicted threats to Frost Fish Creek such as failed septic systems, fertilizer and pesticide use, and road-runoff, pose any definite danger to the water quality of the creek. Each year students analyze their results relative to state standards and identify trends in these data by comparing results with past studies.

## Data Uses

<b>Data User</b>	<b>Data Use</b>
Students	Education
Town of Chatham Water Quality Laboratory	
Local Government	

# Chatham High School

Parameter	Method	Detection Limit	Precision
Temperature			
Conductivity	LaMotte Meter		
Dissolved Oxygen	LaMotte Dissolved Oxygen kit		
pH	LaMotte Meter		
Turbidity	LaMotte Meter		
Fecal Coliform Bacteria	Membrane filtration; Mtec (Chatham Town Lab)		
E. coli Bacteria	Membrane filtration; Mtec (Chatham Town Lab)		
Nitrate-Nitrogen	LaMotte Kit	0.25 ppm	
BOD	LaMotte Kit		
Shoreline Survey			
Observations			

## Funding

Annual Budget: \$3,000

### Percent Funding by Source:

Federal:  
 State:  
 Town: varies  
 Dues:  
 Foundation: varies  
 Business:  
 Other: varies

## Public Events/Outreach

Students publish a report annually and distribute to interested parties.  
 Results displayed at APCC Environmental Expo.

## Contacts

Jean Avery  
 425 Crowell Road  
 Chatham, MA 02633-

Gina Del Sesto  
 425 Crowell Road  
 Chatham MA 02633-

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 Email:  
 WWW:

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 FAX:  
 Email:  
 WWW:

Phone:  
 FAX:  
 Email:  
 WWW:

# Lawrence School Shiverick's Pond Study

<b>Principal Advisor(s):</b>	Pat Harcourt	<b>Staff:</b>	5 teachers
<b>Volunteer Trainer:</b>	Pat Harcourt	<b>Active Volunteers:</b>	10 adults, 250 students/y
<b>Affiliated Program(s):</b>	Waquoit Bay National Estuarine Research Reserve	<b>Year Founded:</b>	1996
		<b>Last update submitted:</b>	2000

## Sampling

<u>Waterbody</u>	<u>Type</u>	<u># of Sites</u>	<u>Town(s)</u>
Shiverick's Pond	F	1	Falmouth
Week's Pond	F	1	Falmouth

**Sampling Season:** September - June  
**Frequency of Sampling:** 10 times/year  
**Time of Sampling:** 8:30 am - 2:30pm  
**Reason for Time:** school day when school is in session

E=Estuarine M=Marine F=Fresh G=Groundwater R=River L=Lake/Pond

## Quality Assurance

**QAPP:** ☐  
**Methods Manual:** ☒  
**Lab:**  
**Volunteer Retraining:** twice/year  
**Software:** Excel  
**Data Entry:** Pat Harcourt and students  
**Data Analysis:** Students guided by teachers  
**Data Products:** Student displays and reports; post on school web page

## Reasons for Sampling/Program Information

1. Establish baseline values for pH, dissolved oxygen, total solids and turbidity; observe rainfall, temperature and cloud cover, and relate to dissolved oxygen; occasionally sample biological oxygen demand (once or twice/year).
2. Instruct students in data collection and analysis methods; provide an opportunity for students to communicate results.
3. Promote student understanding of groundwater, watersheds, and water quality.

## Data Uses

Data User	Data Use
Students	Peer instruction, science fair projects, community information

# Lawrence School Shiverick's Pond Study

Parameter	Method	Detection Limit	Precision
Air Temperature	Thermometer	-10 - 30 C	0.5
Water Temperature	Thermometer	-10 - 30 C	0.5
pH	Color octets	1-14	0.5
Dissolved Oxygen	LaMotte DO Kit (Azide-modified Winkler titration)	0 - 15 ppm	0.5 ppm
Biological Oxygen Demand	LaMotte DO Kit (Azide-modified Winkler titration)	0 - 15 ppm	0.5 ppm
Total Dissolved Solids	Electronic Meter	0 - 999	
Turbidity	Jackson turbidity units via tubes and turbidity fluid	0	10 STU

## Funding

Annual Budget: \$1000 - \$2000

### Percent Funding by Source:

Federal:

State:

Town: 100%

Dues:

Foundation:

Business:

Other:

## Public Events/Outreach

1. Volunteer solicitation through public schools.
2. Student projects and presentations to peers.
3. Science fair projects to community.

## Contacts

Waquoit Bay NERR  
Pat Harcourt  
PO Box 3092  
Waquoit, MA 02536-

Waquoit Bay NERR  
Joan Muller  
PO Box 3092  
Waquoit MA 02536-

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Email: wbnerr@capecod.net  
WWW: <http://www.capecod.net/waquoit>

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WWW:

Phone:  
FAX:  
Email:  
WWW:

Phone:  
FAX:  
Email:  
WWW:

# Laboratories Used by Cape Cod and Islands Citizen Water Quality Monitoring Groups

## Private:

Marine Biological Laboratory  
Water Street  
Woods Hole, MA 02543

Contact: Janice Hanley  
Phone: 508-289-7458

Nantucket Environmental Laboratories  
Nantucket Harbor Life, Inc.  
PO Box 1419  
Nantucket, MA 02557

Contact: Tate Keogan  
Phone: 508-228-1338  
Fax: 508-228-8663  
Certifications: DEP

University of Massachusetts  
Biology Department  
North Dartmouth, MA 02747

Contact: Jefferson Turner  
Phone: 508-999-8229

University of Massachusetts  
Center for Marine Science & Technology  
New Bedford, MA 02744-1221

Contacts: Dr. Brian Howes, Dale Goehring  
Phone: 508-999-8193  
Email: bhowes@umassd.edu

## Federal:

Cape Cod National Seashore Laboratory  
99 Marconi Site Road  
Wellfleet, MA 02667

Contact: Dr. John Portnoy  
Phone: 508-487-3262 ext. 107  
Fax: 508-487-7153  
Email: john\_portnoy@nps.gov

## County:

Barnstable County Health Laboratory  
Dept. of Health and Environment  
Superior Courthouse, Route 6A  
PO Box 427  
Barnstable, MA 02630

Contact: Dr. Thomas F. Bourne  
Phone: 508-375-6605  
Fax: 508-362-7103  
Certifications: DEP

## Town:

Barnstable Water Quality Laboratory  
Dept. of Health, Safety and Environment  
367 Main Street  
Hyannis, MA 02601

Contact: Dr. Dale Saad  
Phone: 508-862-4644  
Fax: 508-790-6304  
Certifications: DEP

Town of Chatham Water Quality Laboratory  
549 Main Street  
Chatham, MA 02633

Contact: Dr. Robert Duncanson  
Phone: 508-945-5188  
Fax: 508-945-5163  
Email: chathamlab@capecod.net  
Certifications: DEP









Waquoit Bay National Estuarine Research Reserve  
Massachusetts Department of Environmental Management  
Division of Forests and Parks - Region 1  
PO Box 3092, Waquoit, MA 02536  
Ph: (508) 457-0495, Fx: (617) 727-5537  
Email: wbnerr@capecod.net  
[www.capecod.net/waquoit](http://www.capecod.net/waquoit)